Agilent Technologies
Innovating the HP Way

Solid-State Optical Mouse Sensor with PS/2 and Quadrature Outputs

Technical Data

HDNS-2000

Features

- **Optical Navigation Technology**
  - Superior precision and smooth navigation optimized for desktop and portable mouse applications
  - No mechanical parts, provides high reliability and needs no maintenance
- **Complete Compact 2-D Motion Sensor**
  - Easy implementation and design flexibility
  - Replaces mechanical ball system in traditional mice
- **Two Selectable Output Modes**
  - Standard 3-Button PS/2 Output Mode
  - Two Channel Quadrature Output Mode (X and Y Direction) which emulates encoder phototransistors
- **High Speed Motion Detection**
  - Accurately measures up to 12 inches per second at 400 cpi
- **Accurate Navigation over a Wide Range of Surfaces**
  - Enables mouse to be used with or without a mouse pad
- **Power Conservation Mode during No Motion**
- **Compatible with High Volume Manufacturing Processes**
  - Requires no precision optical alignment
  - Wave solderable

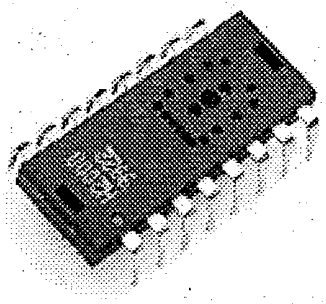
Applications

- **Computer Mice for Desktop PCs, Workstations and Portable Computers**
- **Integrated Input Devices**

Description

The HDNS-2000 is a low-cost reflective optical sensor that provides a non-mechanical tracking engine for implementing a computer mouse.

It is based on optical navigation technology which measures changes in position by optically acquiring sequential surface images (frames) and mathematically determining the direction and magnitude of movement. The sensor is mounted in a plastic optical package and designed to be used with the HDNS-2100 (Lens), HDNS-2200 (LED Assembly Clip), and HLMP-ED80 (High Light Output 639 nm LED), providing a complete and compact tracking engine. This optical tracking engine has no moving parts and requires no precision optical alignment enabling high volume system assembly. The HDNS-2000 offers a PS/2 or quadrature output mode for interface flexibility. Resolution is specified as 400 cpi at rates of motion up to 12 inches per second.



CAUTION: It is advised that normal static precautions be taken in handling and assembly of this component to prevent damage and/or degradation which may be induced by ESD.

Theory of Operation

The HDNS-2000 is based on Optical Navigation Technology. It contains an Image Acquisition System (IAS), Digital Signal Processor (DSP), and a mode selectable PS/2 or quadrature output converter. The IAS acquires images of microscopic surface images via the lens and illumination system provided by the HDNS-2100, HDNS-2200 and the HLMP-ED80. These images are further processed by the DSP to determine direction and distance of motion. The DSP generates a stream of Δx and Δy relative displacement values which are then communicated to the output converter. This converter provides a PS/2 3-Button output, replacing existing mouse microcontrollers, or two channel quadrature output, for direct interface to existing mouse microcontrollers.

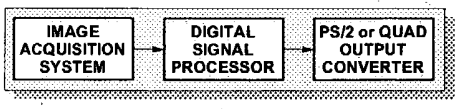


Figure 1. HDNS-2000 Block Diagram.

Ordering Information

Specify Part Number as follows:
HDNS-2000 = Sensor IC in a 16-pin optical plastic package, 20 per tube.

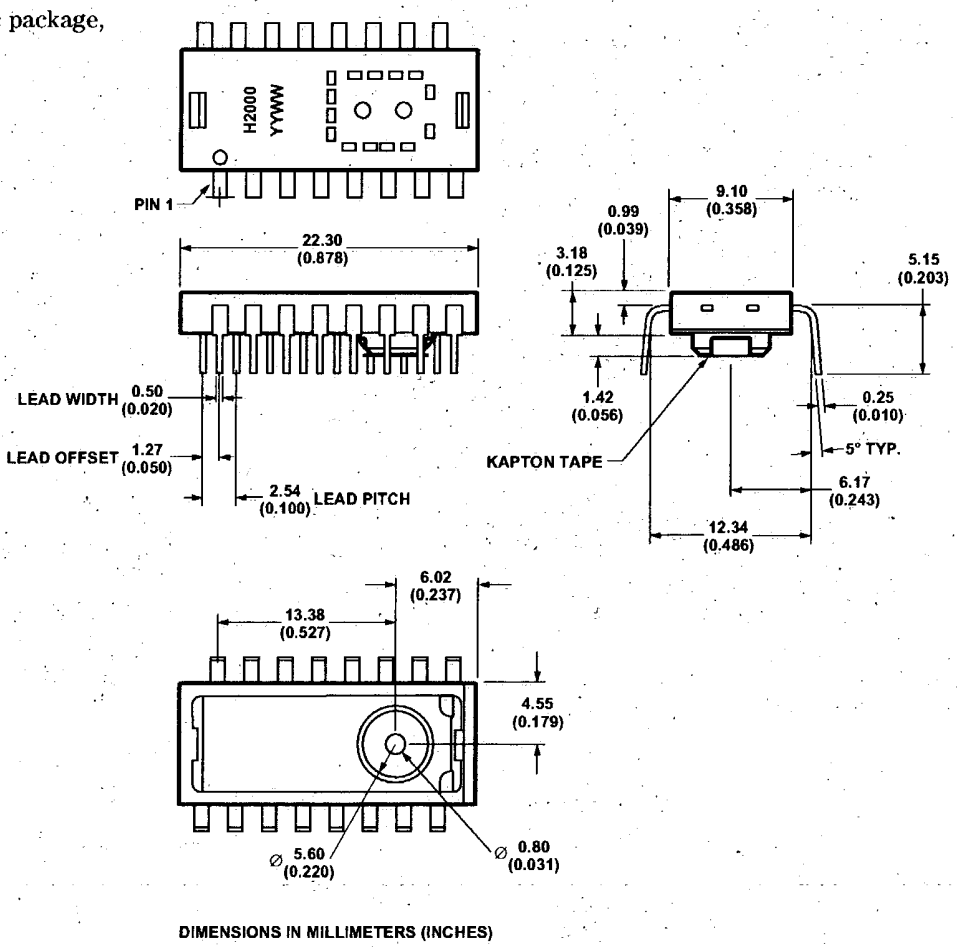


Figure 2. HDNS-2000 Sensor Package Outline Drawing.

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